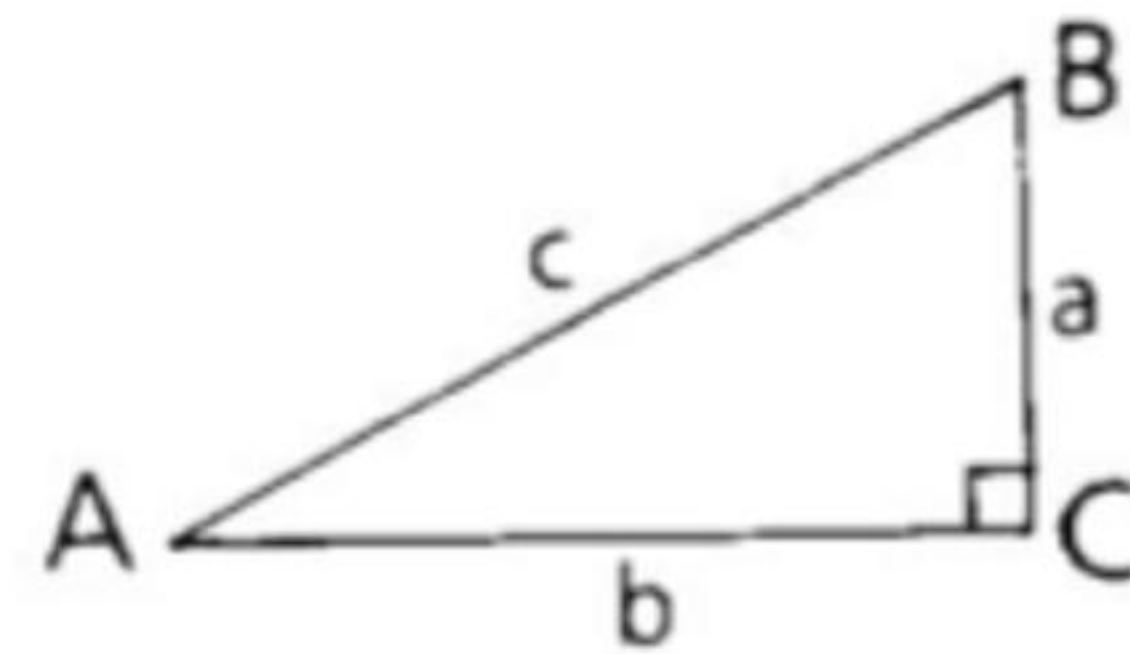


# Definition

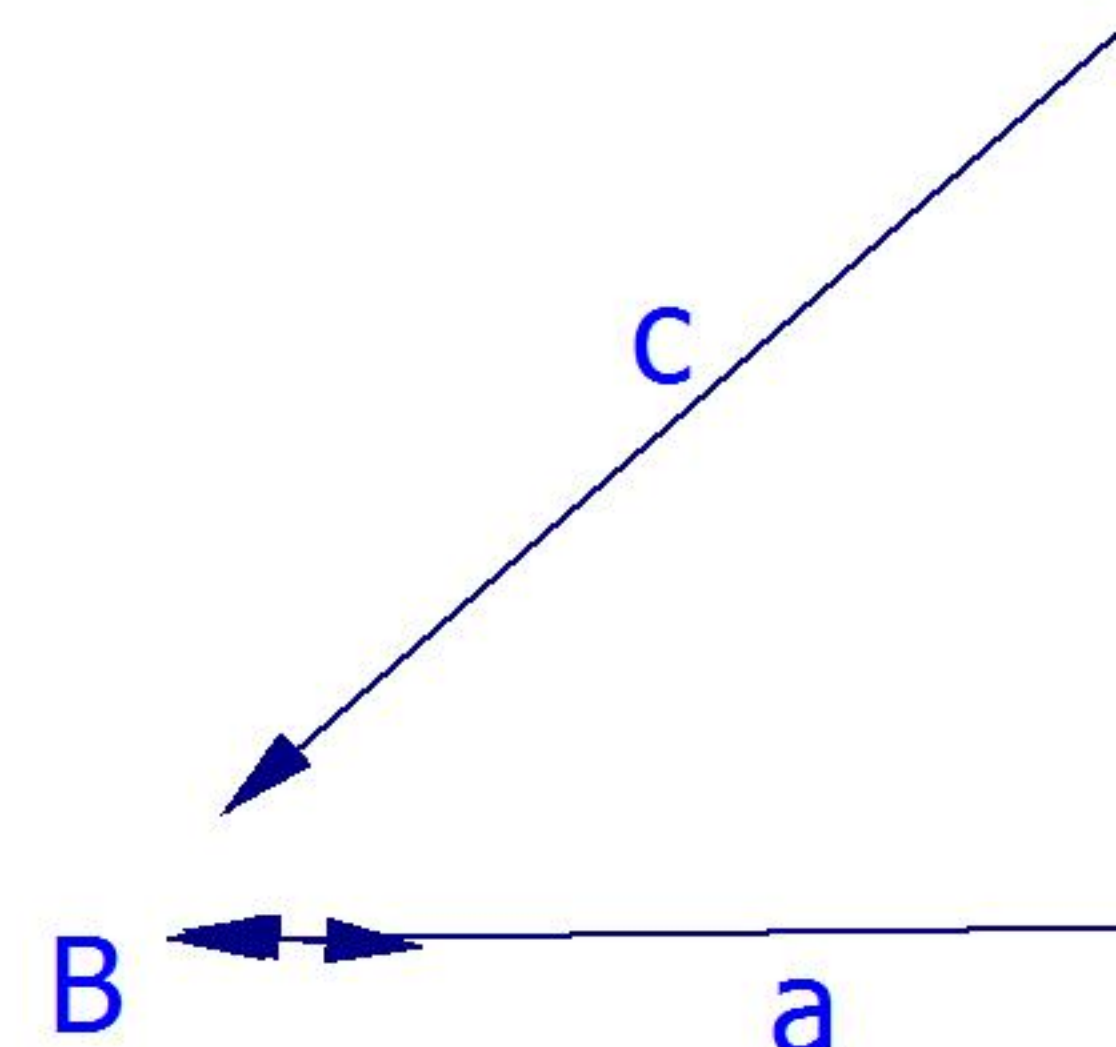
## Three Trigonometric Ratios



$$\text{sine of } \angle A = \sin \angle A = \frac{\text{opposite leg}}{\text{hypotenuse}}$$

$$\text{cosine of } \angle A = \cos \angle A = \frac{\text{adjacent leg}}{\text{hypotenuse}}$$

$$\text{tangent of } \angle A = \tan \angle A = \frac{\text{opposite leg}}{\text{adjacent leg}}$$



19 Use the definitions of the trigonometric ratios to verify the following relationships, given  $\triangle ABC$  in which  $\angle C = 90^\circ$ .

a  $(\sin \angle A)^2 + (\cos \angle A)^2 = 1$

$$\left(\frac{a}{c}\right)^2 + \left(\frac{b}{c}\right)^2 = \frac{a^2 + b^2}{c^2} = \frac{c^2}{c^2} = 1$$

b  $\frac{a}{\sin \angle A} = \frac{b}{\sin \angle B}$

$$\frac{a}{\frac{a}{c}} = \frac{b}{\frac{b}{c}} = c$$

c  $\frac{\sin \angle A}{\cos \angle A} = \tan \angle A$

lucy

$$\frac{a/c}{b/c} = \frac{a}{b} = \tan A \text{ good!}$$

d  $\sin \angle A = \cos (90^\circ - \angle A)$

lucy

$$a/c = \cos (90 - A)$$

$$\cos(B)$$

$$= a/c$$



- 11** The legs of an isosceles triangle are each 18. The base is 14.
- a** Find the base angles to the nearest degree.
  - b** Find the exact length of the altitude to the base.
- 12** One diagonal of a rhombus makes an angle of  $27^\circ$  with a side of the rhombus. If each side of the rhombus has a length of 6.2 in., find the length of each diagonal to the nearest tenth of an inch.
- 13** Find the perimeter of trapezoid ABCD, in which  $\overline{CD} \parallel \overline{AB}$ ,  $\cos \angle A = \frac{1}{2}$ , and  $AD = DC = CB = 2$ .
- 14** Find the length of the apothem of a regular pentagon that has a perimeter of 50 cm.